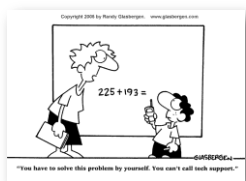




## Addition: Strategies, Models, & Context with the CCSS-M



Documents for the webinar: <http://tinyurl.com/mtifollowup>  
→ Online tab → Webinars → Addition webinar



## Presenter

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## Getting Started



- If you need audio through your phone (can't hear us now):
  - Toll-free: 1-877-739-5903
  - Access Code: 619-400-376
- Webinar ID: 208404582
- Questions
- Polls



## Overview

- Addition in the current Idaho State Standards and the Common Core Standards
- Illustrate strategies identified in the standards
- Investigate context across the grade levels that press models and strategies
- Highlight conceptual understanding and fluency expectations at each grade level
- Credit opportunities

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## Standards Names/Definitions

- The standards that have been in place for the past several years and are currently being assessed on ISAT will be referred to as the **current Idaho State Standards**.
- The new standards (adopted in spring 2011 for implementation in fall 2013) will be referred to as the **Common Core State Standards**



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## Timeline for implementation of the Common Core State Standards & Smarter Balance Assessment

2011-2012 SCHOOL YEAR	2012-2013 SCHOOL YEAR	2013-2014 SCHOOL YEAR	2014-2015 SCHOOL YEAR
Professional Development For Idaho Teachers & Administrators	Professional Development For Idaho Teachers & Administrators	Common Core State Standards Will Be Taught In Idaho	New Common Assessments Based On Common Core State Standards Will Be Delivered

<http://www.k12.wa.us/smarter/>

- Current Kindergarteners will never be tested on the existing Idaho state standards
- Can we wait to begin implementation?

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## Domain Progressions in the CCCSS

K	1	2	3	4	5	6	7	8
Counting and Cardinality								
Number and Operations in Base Ten					Ratios and Proportional Relationships			
			Number and Operations – Fractions		The Number System			
Operations and Algebraic Thinking**					Expressions and Equations			Functions
Geometry								
Measurement and Data*					Statistics and Probability			

\* K-5 Measurement and Data splits into Statistics and Probability and Geometry in Grade 6

\*\*Operations and Algebraic Thinking is foundation for Grade 6 Expressions and Equations and The Number System



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## Domain Progressions in the CCCSS

		K	1	2	3	4	5	6	7	8	
Number & Operations	Counting and Cardinality										
		Number and Operations in Base Ten						Ratios and Proportional Relationships			
								The Number System			
Algebra	Operations and Algebraic Thinking**					Number and Operations – Fractions		The Number System			
								Expressions and Equations			
Geometry								Functions			
Measurement & Data Analysis	Measurement and Data*							Geometry			
								Statistics and Probability			

\* K-5 Measurement and Data splits into Statistics and Probability and Geometry in Grade 6

\*\*Operations and Algebraic Thinking is foundation for Grade 6 Expressions and Equations and The Number System



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Part 1

## IDAHO STATE STANDARDS VS. COMMON CORE STATE STANDARDS



	Current Idaho SS	Common Core SS
Kinder	<b>K.M.1.2.1</b> Use concrete objects to illustrate the concepts of addition and subtraction.	<b>K.OA.2</b> Solve addition and subtraction word problems, and add and subtract within 10, e.g., <i>by using objects or drawings to represent the problem.</i>
1 <sup>st</sup> Grade	<b>1.M.1.2.1</b> Use objects, pictures, and symbols to add up to 10 and subtract from up to 9. <b>2.M.1.2.2</b> Add whole numbers with and without regrouping through 99.	<b>1.OA.6.</b> Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. <i>Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums by creating the known equivalent.</i> <b>2.NBT.5.</b> Fluently add and subtract within 100 <i>using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</i>
2 <sup>nd</sup> Grade	<b>3.M.1.2.2</b> Add and subtract whole numbers with and without regrouping through 999.	<b>3.NBT.2.</b> Fluently add and subtract within 1000 <i>using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.</i>
3 <sup>rd</sup> Grade		<b>4<sup>th</sup> Grade</b> <b>4.NBT.4</b> Fluently add and subtract multi-digit whole numbers using the <i>standard algorithm.</i>

The MTI



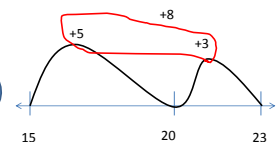
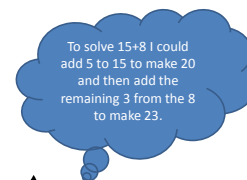
Part 2:

## ADDITION STRATEGIES



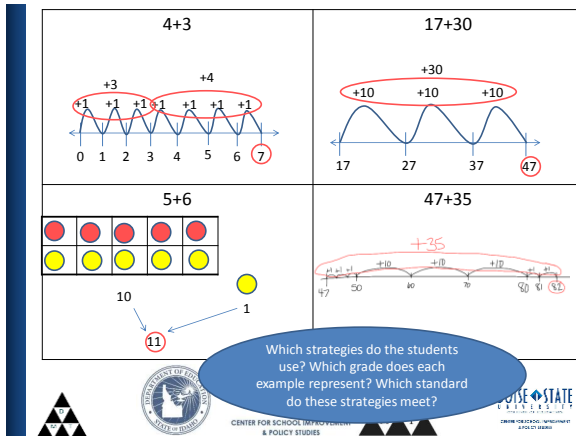
## Strategies and Models

- Strategy
  - How a student chooses to solve a problem
  - Mental Process
- Model
  - How we notate or record strategies

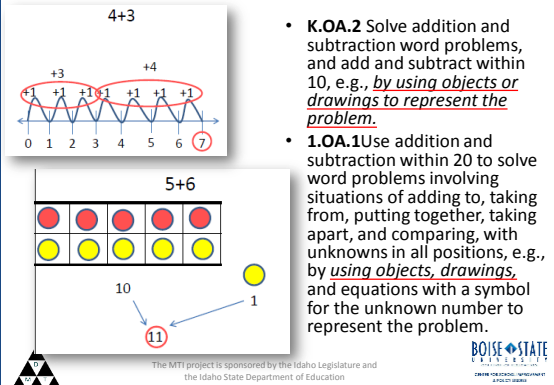


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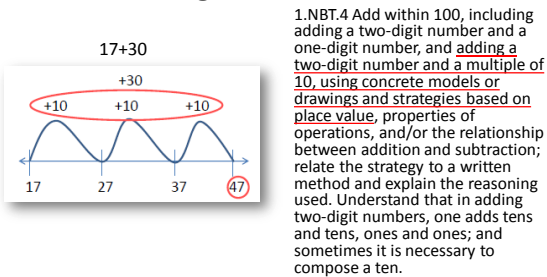




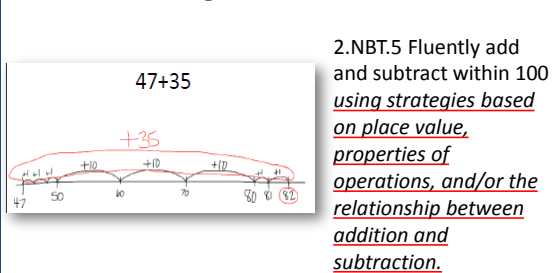
## Strategies and Models



## Strategies and Models



## Strategies and Models

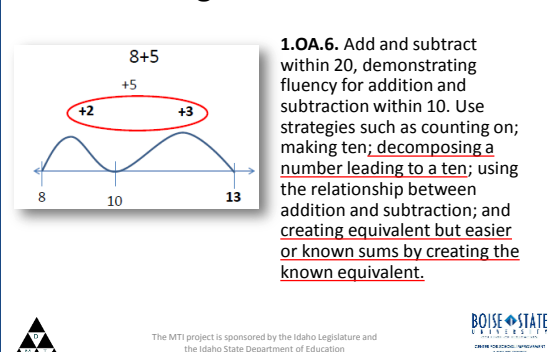


$8+5$ <b>Make a ten</b> <b>Use other known facts</b>	$64+22$ <b>Strategies based on Place Value</b>
$24+59$ <b>Properties of Operations</b> <b>Use other known facts</b>	$352+647$ <b>Counting On</b> <b>Strategies based on place value</b>

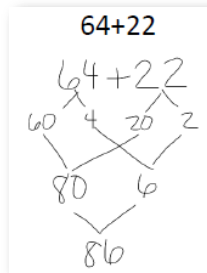
How would a student use these strategies to solve these addition problems? What model or models would you use to notate those strategies?

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## Strategies and Models



## Strategies and Models



**3.NBT.2.** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

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## Strategies and Models

$$\begin{array}{r} 24 + 59 \\ -1 \quad +1 \\ \hline 23 + 60 = 83 \end{array}$$

$$\begin{aligned} 24 + 59 \\ (23+1) + 59 \\ 23 + (1+59) \\ 23 + 60 \end{aligned}$$

**2.NBT.5.** and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

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## Strategies and Models

$$352 + 647$$

$$647 + 300 \rightarrow 947 \xrightarrow{+50} 997 \xrightarrow{+2} 999$$

**2.NBT.5.** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

**3.NBT.2.** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

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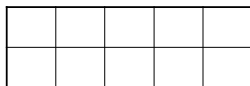
Part 3:

## STRUCTURING LESSONS CONTEXT, STRATEGIES AND MODELS



## Kindergarten and First Grade

- K.OA.2** Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.



- 1.OA.6.** Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums by creating the known equivalent.



## Kindergarten: Conceptual & Contextual

- The parking attendant is trying to figure out how many cars are parked in the parking lot.

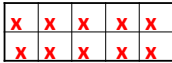


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## 1<sup>st</sup> Grade: Conceptual & Contextual

- The parking attendant needs to figure out how many cars are parked in the parking lot. Can you help her?

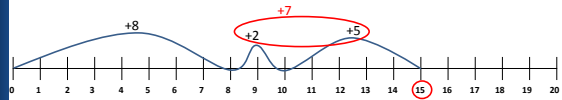
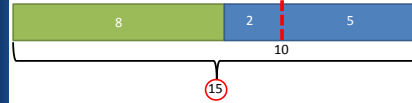


- She doesn't like having people park in the other lot when there are still spots open in the first lot, how many cars can she have move over to fill up the first lot?



## 1<sup>st</sup> Grade: Conceptual & Contextual

She doesn't like having people park in the other lot when there are still spots open in the first lot, how many cars can she have move over to fill up the first lot?



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## Warm Ups to Build Student Strategies

### 1<sup>st</sup> grade Standards

**1.NBT.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

### 2<sup>nd</sup> Grade Standards

**2.NBT.5.** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.



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## Using Strings to Build Relationships

$$9 + 7 =$$

$$19 + 7 =$$

$$9 + 5 =$$

$$39 + 5 =$$

$$9 + 2 =$$

$$49 + 2 =$$

$$59 + 6 =$$

$$28 + 7 =$$

$$10 + 10 =$$

$$2 + 3 =$$

$$12 + 13 =$$

$$30 + 20 =$$

$$4 + 5 =$$

$$34 + 25 =$$

$$40 + 20 =$$

$$1 + 8 =$$

$$41 + 28 =$$

$$52 + 36 =$$



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Lucy went to the park to see the ducks. 37 ducks were swimming in the pond. 6 ducks were sitting in the grass. How many ducks did Lucy see?

### 1<sup>st</sup> grade Standards

**1.NBT.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

### 2<sup>nd</sup> Grade Standards

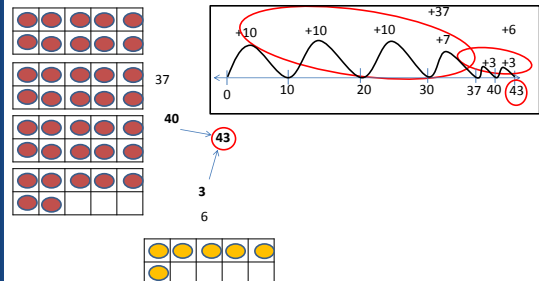
**2.NBT.5.** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.



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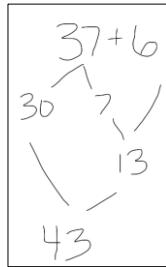
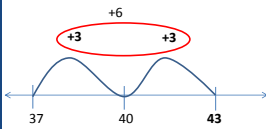
Lucy went to the park to see the ducks. 37 ducks were swimming in the pond. 6 ducks were sitting in the grass. How many ducks did Lucy see?



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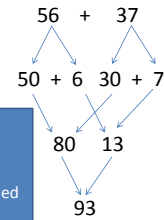
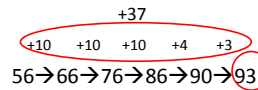


Lucy went to the park to see the ducks. 37 ducks were swimming in the pond. 6 ducks were sitting in the grass. How many ducks did Lucy see?



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Lucy went to the park to see the ducks. 37 ducks were swimming in the pond. 56 ducks were sitting in the grass. How many ducks did Lucy see?



What are the similarities and differences between the two strategies? Which one is most like your strategy? Is there another way they could have added on 37 that would be more efficient? How could you use the arrow language strategy/tree diagram for 73+29?

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The Hunt family drives 154 miles on the first day of their trip. The next day they drive 240 miles. How many miles did they travel in those 2 days?

#### 2<sup>nd</sup> Grade Standards

**2.NBT.7** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

#### 3<sup>rd</sup> Grade Standards

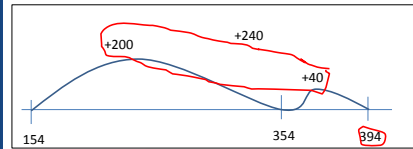
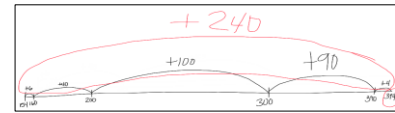
**3.NBT.2.** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.



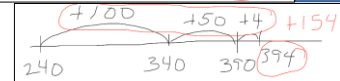
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The Hunt family drives 154 miles on the first day of their trip. The next day they drive 240 miles. How many miles did they travel in those 2 days?



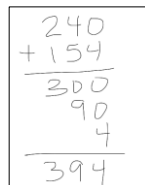
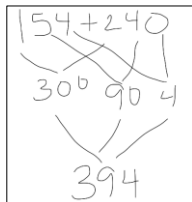
Which number line seems more efficient? Why?



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### Encouraging Flexible Thinking

"Calculating with number sense, as a mathematician, means having many strategies at your disposal, and looking to the numbers first, *before* choosing a strategy" (Fosnot & Dolk, pg. 96)

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Before you solve these, consider-  
Which strategy would you use?

3+2	9+6
5+4	65+4
45+32	327+541
157+35	198+674



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## Final Thoughts

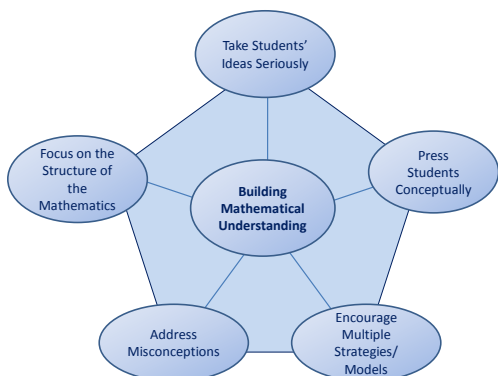
**TABLE 3** Viewing whole-number expectations for arithmetic across grade levels shows that proficiency includes both conceptual understanding and procedural fluency.

Level	Concept that is introduced	Fluency that is expected
K	Add/subtract to 10	Add/subtract to 5
1	Add/subtract to 100	Add/subtract to 10
2	Add/subtract to 1000	Add/subtract to 20 (using mental strategies) Add/subtract to 100
3	Multiply/divide to 100 Multiply 1-digit numbers by multiples of 10 up to 90 Multiply up to a 4-digit number by a 1-digit number	Add/subtract to 1000 Multiply/divide to 100
4	Multiply up to a 2-digit number by a 2-digit number Divide up to a 4-digit number by a 1-digit number	Add/subtract multidigit numbers
5	Divide up to 4-digit numbers by a 2-digit divisor	Multiply multidigit numbers
6		Divide multidigit numbers

Dacey, L., & Polly, D. (2012). Common Core State Standards for Mathematics: The Big Picture. *Teaching Children Mathematics*, 378-382.



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February 2012



## 1 Credit Opportunity

- **Duration:** Accumulate 15 hours of webinar training, live or archived. Additional webinars will be developed and offered during the Fall of 2012. The credit will be earned the semester the 15 hours is completed.
- **Registration:** Upon completion of the 15 hours, a participant will register with BSU for the one professional education credit.
- **Documentation:** Completion of a brief webinar summary and reflection for each webinar is required.
- **Cost:** \$65
- **Note:** The one professional education credit earned for completion and payment of \$65, does not count towards the three credits earned with completion of the MTI course. The webinars are follow-up support after completion of the MTI course.
- **Information:** <http://www.sde.idaho.gov/site/math/mti.htm>
- **Questions:** Nichole Hall [nhall@sde.idaho.gov](mailto:nhall@sde.idaho.gov)



Thank you for attending the webinar!

- Questions
- Contact Information
  - Sarah Reynolds: [sarahreynolds@boisestate.edu](mailto:sarahreynolds@boisestate.edu)
  - Christina Tondevold: [christinatondevold@boisestate.edu](mailto:christinatondevold@boisestate.edu)
- DMT Website- <http://dmf.boisestate.edu>
- Follow Up Opportunities: <http://www.tinyurl.com/mtifollowup>

